IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF MICHIGAN

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	CIVIL ACTION NO. 1:92:CV:659
	)	
v.	)	JUDGE
	)	
THE UPJOHN COMPANY;	)	
KALAMAZOO COUNTY;	)	
CHARTER TOWNSHIP OF OSHTEMO;	)	
CITY OF KALAMAZOO,	)	
	)	
Defendants.	)	
	)	

FIRST AMENDMENT TO CONSENT DECREE

Introduction

1. Plaintiff, the United States of America on behalf of the United States Environmental Protection Agency ("U.S. EPA"), negotiated a Consent Decree with Settling Defendants, which was entered by this Court on November 17, 1992. Pursuant to this Consent Decree, certain Settling Defendants – Pharmacia & Upjohn Company (f/k/a The Upjohn Company), Kalamazoo County, Charter Township of Oshtemo, and the City of Kalamazoo (hereafter collectively, "Performing Settling Defendants") are implementing the selected remedy through the September 28, 1990 Record of Decision ("1990 ROD"), for the West KL Avenue Landfill Superfund site, located on West KL Avenue in Oshtemo Township, Kalamazoo County, Michigan (the "Site"), and together with other Settling Defendants are paying certain response costs incurred and to be incurred by the United States for the Site.

2. As required by the Consent Decree, Appendix 1, Record of Decision and Appendix 2, Scope of Work, the Performing Settling Defendants have performed studies, originally aimed at effectively designing the remedy as selected in the 1990 ROD, which were later expanded, with U.S. EPA and Michigan Department of Environmental Quality (MDEQ) approval and supervision, to include investigation of the potential for natural attenuation of contaminants in both the groundwater plume and source materials. These studies determined, among other things, that there is groundwater contamination in the vicinity of the West KL Avenue Landfill not previously identified or predicted. Although the Performing Settling Defendants assert that this area of contamination is not attributable to the landfill, the U.S. EPA has not determined that the studies have conclusively identified the source(s) of this extended area of contamination or eliminated the landfill as a source.

3. On February 27, 2003, U.S. EPA selected, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, (CERCLA), 42 U.S.C. §9605, and the National Contingency Plan, 40 C.F.R. Part 300 (NCP), an amendment to the Site ROD in a Record of Decision Amendment (ROD Amendment).

4. The February 27, 2003 ROD Amendment requires the establishment of a new municipal water service zone or alternative institutional controls around the newly discovered area with contamination, and a buffer zone within a determined area extending beyond the contamination, in which every property in the zone will be hooked up to the City of Kalamazoo's municipal water system, and in which groundwater use will be restricted. The ROD Amendment revises the groundwater cleanup standards established in the 1990 ROD, replacing the Michigan Act 307 type B standards with the current residential standards established under Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (formerly known as Michigan Act 307). The ROD Amendment also provides for the continuation of natural attenuation studies and calls for the preparation of the landfill cap design to continue while those studies are underway.

5. Plaintiff and Performing Settling Defendants have agreed to modify the terms of the Consent Decree, pursuant to Paragraph 85 of the Consent Decree and subject to the Court's approval, after opportunity for public comment, requiring the Performing Settling Defendants to implement the provisions of the February 27, 2003 ROD Amendment.

6. Plaintiff and Performing Settling Defendants have agreed to modify the terms of the Consent Decree to amend the Work that the Performing Settling Defendants are performing under the Consent Decree. The Settling Defendants other than the Performing Settling Defendants have no obligations under this First Amendment to the Consent Decree except as otherwise provided herein. Plaintiff and Performing Settling Defendants will move the Court to enter this First Amendment to the Consent Decree after closure of a public comment period and after service on all Parties and an opportunity to object.

7. The Parties recognize, and the Court by entering this First Amendment to the Consent Decree finds, that this First Amendment to the Consent Decree has been negotiated by the Parties in good faith and is fair, reasonable, and in the public interest.

NOW THEREFORE, without adjudication of any issue of fact or law, and upon consent of the parties hereto, it is hereby ORDERED, ADJUDGED, AND DECREED as follows:

General Provisions of this First Amendment

8. a. All terms and phrases in this First Amendment to the Consent Decree shall be defined as provided in the Consent Decree except as specifically provided in this First Amendment to the Consent Decree.

b. The rights and obligations under the Consent Decree of the Settling Defendants and the United States are not modified except as specifically provided in this First Amendment to the Consent Decree.

9. The Consent Decree, Appendix 2, "Scope of Work for the Remedial Design and Remedial Action Work Plan at West KL Avenue Landfill, Kalamazoo, Michigan" is amended with Appendix 1 to this First Amendment to the Consent Decree, attached and incorporated herein by reference, entitled: "Modification of Appendix 2, Scope of Work for the Remedial Design and Remedial Action Work Plan at West KL Avenue Landfill, Kalamazoo, Michigan."

10. The last sentence of paragraph 12.a.2) in the Consent Decree is amended:

a. by deleting the following:
"If more stringent than the above, the procedures as outlined in Michigan Act 307, Rule 299.5723 for carcinogens, and Rule 299.5725 for non-carcinogens shall be followed.", and;

b. by inserting the following in place of the deleted sentence:
"If more stringent than the above, the procedures and standards provided by Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (formerly known as Michigan Act 307) for carcinogens and for non-carcinogens shall be followed. A summary table of these cleanup standards applicable to the site is provided in Table 2 of the ROD Amendment attached to the First Amendment to the Consent Decree as Appendix 2 ".

11. The Performing Settling Defendants shall begin implementing the provisions of this First Amendment within 30 days of lodging of this First Amendment to the Consent Decree.

12. Except as provided herein, all of the terms, provisions, covenants and conditions of the Consent Decree shall continue in full force and effect and shall be fulfilled by the Parties thereto, in accordance with the Consent Decree.

13. Lodging and Opportunity for Public Comment.

a. This First Amendment to the Consent Decree shall be lodged with the Court for a period of not less than 30 days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. Section 9622(d)(2), and 28 C.F.R. Section 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding this First Amendment disclose facts or considerations which indicate that the First Amendment to the Consent Decree is inappropriate, improper, or inadequate. Performing Settling Defendants consent to the entry of this First Amendment to the Consent Decree without further notice.

b. If for any reason the Court should decline to approve this First Amendment to the Consent Decree in the form presented, this First Amendment is voidable at the sole discretion of the United States or the Performing Settling Defendants and its terms may not be used as evidence in any litigation whether or not between the United States and the Performing Settling Defendants.

14. Any further material modification to the Work to be conducted pursuant to the Consent Decree or the First Amendment may be made upon written agreement of the United States and the Performing Settling Defendants, provided that no such material modification shall be effective without the approval and entry by the Court. In all other respects the provisions of Paragraph 85 of the Consent Decree shall remain in effect except that notification to and approval of the Settling Defendants other than the Performing Settling Defendants of any material modification to the Work shall not be required pursuant to Paragraph 85 of the Consent Decree.

15. Each undersigned representative of a Performing Settling Defendant to this First Amendment to the Consent Decree and the Assistant Attorney General for the Environment and Natural Resources Division of the United States Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this First Amendment to the Consent Decree and to execute and legally bind such Party to this document.

16. Each Performing Settling Defendant agrees not to oppose entry of this First Amendment to the Consent Decree by this Court or to challenge any provision of this First Amendment to the Consent Decree unless the United States has notified the Performing Settling Defendants in writing that it no longer supports entry of the First Amendment to the Consent Decree.

17. Each Performing Settling Defendant agrees to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons.

18. The Court finds that this First Amendment to the Consent Decree is fair, reasonable and in the public interest.

19. This First Amendment to the Consent Decree shall be effective on the date of entry by this Court, except that the provisions of Paragraph 10 regarding implementation of the provisions of this First Amendment to the Consent Decree by Performing Settling Defendants shall be effective upon the date of lodging of this First Amendment to the Consent Decree.

IT IS SO AGREED:

DEFENDANTS,
The undersigned Settling Defendant hereby consents to the First Amendment to the Consent Decree in U.S. v. West KL Avenue Landfill, et al.

CITY OF KALAMAZOO
Name of Settling Defendant

241 W. South Street
Kalamazoo, MI 49007

By: Robert H. Cinabro

(Signature of officer)

City Attorney
Title

July 6, 2004
Date

(Place corporate seal and acknowledgment of authority of officer to sign here)

If different from above, the following is the name and address of this Settling Defendant's agent for service of process:

Name

Address

DEFENDANTS,
The undersigned Settling Defendant hereby consents to the First Amendment to the Consent Decree in U.S. v. West KL Avenue Landfill, et al.

County of Kalamazoo
Name of Settling Defendant (Type)

201 West Kalamazoo Avenue

Kalamazoo, MI 49007
Address

By: D.J. Buchholtz-Hiemstra
Name of Officer (Type)

(Signature of officer)

Chairperson, Board of Commissioners
Title

August 3, 2004
Date

(Place corporate seal and acknowledgment of authority of officer to sign here)

Timothy A. Snow, County Clerk

If different from above, the following is the name and address of this Settling Defendant's agent for service of process:

Name

Address

DEFENDANTS,
The undersigned Settling Defendant hereby consents to the First Amendment to the Consent Decree in U.S. v. West KL Avenue Landfill, et al.

Pharmacia & Upjohn Company (f/k/a The Upjohn Company)
Name of Settling Defendant (Type)

235 East 42nd Street

New York, NY 10017-5755
Address

By: Steven F. Kemp
Name of Officer (Type)

(Signature of Officer)

Vice President
Title

July 22, 2004
Date

(Place corporate seal and acknowledgment of authority of officer to sign here)
If different from above, the following is the name and address of this Settling Defendant's agent for service of process:

Name

Address

DEFENDANTS,
The undersigned Settling Defendant hereby consents to the First Amendment to the Consent Decree in U.S. v. West KL Avenue Landfill, et al.

Charter Township of Oshtemo
Name of Settling Defendant (Type)

7275 West Main Street

Kalamazoo, MI 49009
Address

By: John VanDyke
Name of Officer (Type)

SUPERVISOR
(Signature of officer)

Supervisor
Title

July 1, 2004
Date

(Place corporate seal and acknowledgment of authority of officer to sign here)

not applicable

If different from above, the following is the name and address of this Settling Defendant's agent for service of process: not applicable

Name

Address

PLAINTIFF,
UNITED STATES OF AMERICA:

PLAINTIFF,
UNITED STATES OF AMERICA:

By:_____
Thomas L. Sansonetti
Assistant Attorney General
Environment and Natural Resources Division
United States Department of Justice

By:_____
Francis J. Biros
Trial Attorney
Environmental Enforcement Section
United States Department of Justice
P.O. Box 7611, Ben Franklin Station
Washington, D.C. 20044

Margaret M. Chiara
United States Attorney
Western District of Michigan

By:_____
W. Francesca Ferguson
Assistant United States Attorney
Western District of Michigan
333 Ionia Avenue, N.W.
Suite 501
Grand Rapids, Michigan 49503

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY:

By: Richard C Karl

Richard C. Karl
Director, Superfund Division
U.S. Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, Illinois 60604

ENTERED, this 10 day of August, 2004.

_____
JUDGE
United States District Judge

MODIFICATION OF APPENDIX 2

SCOPE OF WORK FOR THE REMEDIAL DESIGN
AND REMEDIAL ACTION WORK PLAN
AT
WEST KL AVENUE LANDFILL, KALAMAZOO, MICHIGAN

I. PURPOSE

The purpose of this Remedial Action at the West KL Avenue Landfill (the Facility) is to implement the Record of Decision for this Facility which was signed by the Regional Administrator on September 28, 1990, as amended by the Record of Decision Amendment, which was signed by the Director, Superfund Division on February 27, 2003. U.S. EPA Superfund Remedial Design and Remedial Action Guidance, the Final Record of Decision, the approved Remedial Design/Remedial Action (RD/RA) Work Plan, any additional guidance provided by U.S. EPA, and this Scope of Work (SOW) shall be followed in designing and implementing this Remedial Action at the Facility as well as the provisions as stated within the Consent Decree.

II. DESCRIPTION OF THE REMEDIAL ACTION

A. Performance Standards:

The performance standards and specifications of the major components of the remedial action for the Facility that shall be designed and implemented by the Settling Defendants are:

1. Fence Installation:

Settling Defendants shall install a fence around the landfill and other areas containing equipment for remedial action activities and maintain the fence in good repair. The fence will aid in protecting the integrity of the landfill cap and the groundwater treatment structures, and will restrict access to the landfill by trespassers. The fence shall consist of a six-foot high chain link perimeter fence topped with three-strand barbed wire. The length of the fence will be determined after the design of the landfill cap and the placement of the groundwater treatment facility. Warning signs shall be posted at 200-foot intervals along the fence and at the gate, or one sign per side if the sides are less than 200 feet in length. The warning signs shall advise that the area is hazardous due to the presence of hazardous wastes/substances which may pose a risk to public health through direct contact. The signs shall also provide a local contact's telephone number to call for further information.

2. Institutional Controls:

a. Landfill Institutional Controls.
Settling Defendants shall cause to be implemented institutional controls, in accordance with Section V, paragraph (9) of the Consent Decree, to prohibit future development of the Landfill (including, but not limited to, on-site excavations, construction and drilling) and to prohibit the installation of groundwater drinking water supplies at the Facility and within the area bounded by the Landfill to the east, the western most 4th Street residences to the west, the northern most Almena Ave. residences to the north and the southern most West KL Avenue residences to the south. The deed restrictions regarding future development of the Landfill shall be considered permanent, while the restrictions regarding the future installations of groundwater drinking water wells may be lifted if the contaminant levels within the groundwater at the Facility and within the zone noted above, fall below, and remain below, the cleanup standards, as determined by the U.S. EPA.

b. Record of Decision Amendment Groundwater Institutional Controls.
The Settling Defendants shall use best efforts to implement, or cause to be implemented, institutional controls through appropriate local governmental action prohibiting installation and use of private drinking water wells within the municipal water supply zone created by the February 27, 2003, ROD Amendment and generally depicted in Figure 1 to this Modification of Appendix 2. If Settling Defendants are unable to obtain such institutional controls through local governmental action within six months from the date of lodging, then Settling Defendants shall promptly notify the United States. The United States thereafter may direct, in its discretion, the Settling Defendants to use best efforts to obtain deed restrictions prohibiting installation and use of private drinking water wells within the municipal water supply zone. If such deed restrictions are not obtained despite best efforts within four months, the Settling Defendants shall promptly notify the United States. The United States thereafter may assist the Settling Defendants in obtaining deed restrictions, to the extent necessary to effectuate the remedial action for the Facility, using such means as it deems appropriate. The United States' costs in this effort,

including attorneys' fees and other expenses and any compensation that the United States may be required to pay to the property owner, shall be considered costs of response and shall be reimbursed by Settling Defendants in accordance with Section XVI of the Consent Decree (Reimbursement).

In lieu of the institutional control methods specified above in this Paragraph II.A.2.b., Settling Defendants may propose an alternative reasonable institutional control method and timetable for prohibiting installation and use of private drinking water wells within the municipal water supply zone. Upon approval of any such alternative institutional control method, Settling Defendants shall implement the alternative institutional control method as approved by U.S. EPA, in accordance with the timetable approved by U.S. EPA. Any determination by U.S. EPA with respect to an alternative institutional control method shall constitute a determination regarding the selection or adequacy of a response action under the Consent Decree.

Institutional controls required pursuant to this paragraph II.A.2.b. may be terminated if contaminant levels within the groundwater at the Facility and within the service zone fall below, and remain below the cleanup standards, as determined by U.S. EPA. The Settling Defendants shall submit any proposal to terminate the institutional controls to U.S. EPA for approval. The Settling Defendants shall obtain approval from U.S. EPA prior to implementing any such change.

3. Access/Deed/Easement:

Settling Defendants, in accordance with Section V, paragraph 9 of the Consent Decree, shall secure access to the Facility and all adjacent areas where Work is to be performed pursuant to the Consent Decree and this SOW and shall acquire deeds or easements, as necessary, to cap and fence the Landfill and to install monitoring wells, the groundwater extraction wells and all the components of the treatment facility, including discharge lines, injection wells and/or infiltration ponds, on those portions of the Facility not presently owned by the Settling Defendants.

4. Installation and Implementation of Groundwater Monitoring Program:

The groundwater monitoring program shall be designed to detect changes in contaminant characteristics and increases/decreases in the concentration of hazardous substances, pollutants and contaminants in the shallow and deep aquifer at and near the Facility. Groundwater monitoring shall include, but not be limited to, collection and field and laboratory analysis of samples from selected monitoring and residential wells identified in the Work Plan and approved by the U.S. EPA, in consultation with the Michigan Department of Natural Resources (MDNR). The monitoring wells shall be screened in the upper and lower aquifers. Field analysis performed shall include, groundwater elevation, pH, temperature, turbidity, specific conductivity, redox potential, dissolved oxygen, chlorine, and Total Organic Carbon (TOC). Laboratory analysis performed shall include EPA's Target Analyte List (TAL) inorganics and EPA's Target Compound List (TCL) organics (as listed in the "Final Standard Quality Assurance Project Plan Content Document", June 1989) on an annual basis, with a smaller list of indicator parameters (provided below) to be sampled on a quarterly basis. Following receipt of certification of completion of remedial construction, after three years of sampling on an annual/quarterly basis, the Settling Defendants may petition to switch to an annual/semi-annual sampling frequency if there has been no significant change in the sample results from quarter to quarter. The indicator parameters to be sampled quarterly include, but are not necessarily limited to, the following: vinyl chloride, 1,1-dichloroethane, 1,2-dichloroethane, trans-1,2-dichloroethene, acetone, 4-methyl-2-pentanone, 2-butanone, benzene, toluene, xylene, ethylbenzene, phenol, barium, cadmium, chromium, lead, manganese, iron, and nickel. The indicator parameters are chemicals of concern within the shallow groundwater as stated in the Remedial Investigation Report and were used to compute the health risk in the Risk Assessment. Monitoring wells designed for sampling will be consistent with Section II.C. of this SOW and will be determined in the Work Plan and within the Operation and Maintenance Plan, consistent with the requirements of Section III, Task II of this SOW. The frequency of sampling and the parameters sampled at each selected monitoring well shall be detailed within the Work Plan and the Operation and Maintenance Plan. The best available detection limit shall be identified by the Settling Defendants in the Work Plan and the Quality Assurance Plan and subject to approval by the U.S. EPA, in consultation with the MDNR. The best available

detection limit shall be the more stringent of Federal detection limits for that parameter or the State detection limit, as provided in Attachment A to the SOW (MDNR memo dated April 1, 1991 from James G. Truchan), as the detection limits may be amended. Criteria regarding the calculating of the carcinogenic and noncarcinogenic risks are described in paragraphs 12.a.2 and 12.a.3 of the Consent Decree.

5. Surface Water Monitoring:

Bonnie Castle Lake, Dustin Lake and the unnamed ponds immediately adjacent to the Landfill will be sampled at locations, at a frequency and for parameters detailed in the Work Plan and approved by the U.S. EPA, in consultation with the MDNR. If an on-site infiltration pond is utilized for discharge of treated groundwater, then this pond will be sampled quarterly, for parameters detailed in the Work Plan. The best available detection limit shall be identified by the Settling Defendants in the Work Plan and the Quality Assurance Plan and subject to approval by the U.S. EPA, in consultation with the MDNR. The best available detection limit shall be the more stringent of Federal detection limits for that parameter or the State detection limit, as provided in Attachment A to the SOW (MDNR memo dated April 1, 1991 from James G. Truchan), as the detection limits may be amended. Criteria regarding the calculating of the carcinogenic and noncarcinogenic risks are described in paragraphs 12.a.2 and 12.a.3 of the Consent Decree. If sampling reveals contamination entering any surface water body in excess of any State or Federal regulation, i.e. Clean Water Act, appropriate action shall be taken.

6. Installation and Operation of a Groundwater Extraction Treatment System:

The groundwater extraction system shall be a network of wells designed to intercept and remove contaminated groundwater at and beyond the edge of the Landfill. Groundwater shall be extracted for the time periods as provided in Paragraph 12(a)(5) of the Consent Decree and until the cleanup standards as referenced in the Consent Decree are achieved. In brief, the groundwater shall be pumped until federal and state ARARs, including ARARs defined in the Feasibility Study and the Record of Decision, are obtained, which ever is more stringent. Specifically, the concentration of each hazardous substance, pollutant or contaminant detected in

groundwater shall attain and thereafter shall not exceed the cleanup standards provided in Paragraph 12.a.2. of the Consent Decree.

The groundwater extraction wells shall be designed and operated to pump sufficient quantities of groundwater to capture and extract the entire contaminated plume with the overlap of each adjacent extraction well's cone of influence being approximately 20 to 25%. The Work Plan shall describe the process to determine the number of withdrawal wells needed and an estimated total gallons per minute (gpm) necessary to capture the contaminated plume(s). A collection and transportation system shall be used to transport extracted groundwater to a central treatment unit for treatment and analysis prior to being discharged to either the shallow aquifer, the City of Kalamazoo's POTW, or an on-site infiltration pond. Any piping used shall be buried sufficiently below grade or insulated to prevent freezing.

Extracted groundwater shall be treated to the appropriate levels necessary to comply with the discharge limits established for that recipient. Any discharges to the shallow aquifer shall be in compliance with MI Act 307 and the Clean Water Act, 33 U.S.C., Section 1251 et seq. Any discharge into the shallow aquifer shall be placed as close as practicable to the landfill, but shall not be placed in such a location as to affect the relationship of the aquifer with Bonnie Castle Lake, or any other local surface water body, cause flooding of low lying areas, or cause reinjected groundwater to escape the extraction wells, such as a location that may be on the opposite side of a groundwater divide from the Facility. Any discharges to the POTW shall be in compliance with a pretreatment permit and applicable federal pretreatment requirements. Any discharges to surface water bodies, such as to an on-site infiltration pond shall meet all state and federal requirements applicable to surface water discharges. Discharge limits and discharge requirements regarding any discharges to the shallow aquifer or to a surface water body shall be detailed in the Work Plan and approved by the U.S. EPA, in consultation with the MDNR.

Extracted groundwater shall be treated to decrease, and to minimize or eliminate, concentrations of hazardous substances, pollutants and contaminants. Treatment may be needed to enable the extracted groundwater to meet the appropriate standards regarding air and surface

water discharges or the standards regarding injection of water back into the aquifer. The treatment process(es) shall include the following steps:

* The use of enhanced bioremediation using fixed film bioreactors, and/or other additional technologies approved by U.S. EPA, prior to any discharge to the shallow aquifer or into a surface water body such as an on-site infiltration pond, or if a POTW is utilized, pretreatment to remove hazardous substances, pollutants and contaminants, if the POTW requires a reduction of these prior to discharge to the sewer system; and

* Precipitation to remove inorganics, if necessary, prior to any discharge.

Air emissions associated with the treatment of contaminated groundwater shall be captured and treated, as necessary, to meet the standards as stated within federal and state regulations.

If groundwater monitoring indicates that contaminated groundwater within the shallow aquifer is not sufficiently being captured, that concentrations of contaminants in the shallow aquifer are not decreasing at the determined rate, as determined during the remedial design and approved by the U.S. EPA, or that contaminants are found in the deep aquifer, the U.S. EPA may require a combination of additional groundwater extraction wells and/or increasing the pumping rates of the extraction wells.

If groundwater monitoring indicates that the concentration of one or more of the contaminants has increased above the cleanup standards, pursuant to paragraphs 12.a.2 and 12.a.3 of the Consent Decree, after the groundwater extraction system has been completed or shut down, pursuant to paragraph 12.a.5., the groundwater extraction/treatment system shall be reactivated as provided by paragraph 12.a.5 of the Consent Decree.

A detailed design of the treatment system shall describe construction and operation of the system and specify the needs for any site pilot testing and any modifications arising from the testing.

7. Landfill Cover:

Settling Defendants shall design and install the landfill cover to meet or exceed the requirements stated within the ROD. Specifically, the landfill cap shall consist of a multi-layer cap and shall include:

* GRADING LAYER: this layer may not be warranted in all areas of the Facility since the Facility has been previously covered. Where needed, a minimum 6 inch thick grading layer shall be designed, installed and maintained over the final elevation to attain the required slope and provide for a stable base for subsequent system components.

* GAS VENTING AND TREATMENT SYSTEM: the cap shall have a final cover system capable of allowing removal, monitoring, and, if needed, treatment of generated landfill gases.

* CLAY CAPPING LAYER: a minimum 2 foot thick clay cap or other material of equivalent or superior performance or of equivalent or lower permeability shall be designed, installed and maintained to provide a low hydraulic conductivity barrier to percolation. The specifications of the clay capping layer are listed within Michigan Act 64, (excluding the 90 cm thickness requirement).

* SYNTHETIC LINER LAYER: a 60 mil high density polyethylene liner, or other membrane with equal or better performance, shall be placed over the clay layer to provide a nearly impermeable layer over the Site.

* DRAINAGE LAYER: a minimum 12 inch thick layer composed of pea gravel with a 6-ounce geotextile filter-fabric placed above it. This layer shall provide for lateral drainage of precipitation.

* COVER LAYER: a minimum 2 foot thick soil cover layer shall be designed and placed above the clay capping layer which shall provide rooting depth for vegetation and protect the clay capping layer and the synthetic liner layer from damage due to freeze-thaw and desiccation.

* TOPSOIL: a minimum of 6 inches of topsoil shall be designed and placed over the cover layer which shall support and sustain the proposed vegetation.

* REVEGETATION: Seed and fertilizer shall be applied to the topsoil layer to establish a vegetation cover. The vegetation shall be a persistent species having roots that will not penetrate beyond the vegetative layer. The seed type and amount of fertilizer applied shall be proposed in the Design and Specifications Plan and will depend on the type and quality of topsoil and compatibility with both native vegetation and the final site use.

8. Landfill Gas:

Landfill gas vents shall be installed to prevent gases from migrating horizontally away from the site and from ruining the integrity of the landfill cap. Approximately 1 vent per 5 acres capped, at a minimum, will be necessary. Landfill gas from the gas vents shall be monitored for parameters and at a frequency as determined by state and federal regulations and detailed in the Work Plan. If at any time the gas monitoring indicates a confirmed release of contaminants into the air that presents a health hazard (based on U.S. EPA risk assessment guidance or the minimum requirements of State or federal regulations) outside the landfill boundaries (cumulative excess cancer risk greater than $1x10^{-6}$ or cumulative HI value greater than 1) Settling Defendants shall propose the appropriate measures needed to further evaluate, and if appropriate, as determined by U.S. EPA, in consultation with the MDNR, reduce or eliminate the releases. If appropriate, as determined by U.S. EPA, Settling Defendants shall implement measures necessary to reduce or eliminate the releases. A confirmed release is defined by the recording of quantifiable sampling results from two consecutive sampling events taken from within the same area of the landfill. Also, if at any time the landfill gas on-site or migrating horizontally off-site presents an explosive hazard, as determined by U.S. EPA, in consultation with the MDNR, and pursuant to 40 CFR Part 257.3-8, appropriate action will be taken.

9. Municipal Water Supply

The Settling Defendants shall supply municipal water to all private well users within the area indicated on Figure 1, and generally bounded by KL Avenue to the south, West Main Street to the north, 2nd Street the west, and the landfill property boundary to the east. This task shall include abandonment of the private

drinking water well at each property supplied with municipal water and connection of each residential water service to the City of Kalamazoo municipal water system. This action will create a buffer zone around the groundwater plume ensuring protection of the drinking water supply while monitored natural attenuation is ongoing. This action allows for retention of the existing well if the well be used solely for irrigation or other non-potable uses.

Within 30 days of lodging of the Consent Decree Amendment the Settling Defendants shall submit, to U.S. EPA for review and approval, a draft Amendment to the July 30, 1999 "Work Plan for Municipal Water Installation, Springwood Hills Subdivision Area". The amendment shall include a description of the work to be performed, project organization, points of contact, reporting requirements, and a schedule for completion of the work.

B. Cleanup Standards:

The Work required by the Consent Decree and this SOW shall be designed, installed, operated and maintained to achieve the Cleanup Standards as stated within the Consent Decree, paragraphs 12.a.2 and 12.a.3, as amended by paragraph 9 of the First Amendment to Consent Decree.

C. Points of Compliance:

In order to monitor and evaluate the remedial actions throughout the Facility, certain groundwater monitoring wells shall be selected as sampling points as per paragraphs 12.a.2 and 12.a.3 of the Consent Decree. Points of Compliance with regard to groundwater shall be the landfill boundary and all points beyond, i.e. locations where the cleanup standards as per Section II.B of this SOW, must be met. The groundwater monitoring program will be detailed in the Work Plan and in the Operation and Maintenance Plan. The monitoring wells to be sampled annually and quarterly as per Section II.A.4 of this SOW shall include but not be limited to the following wells: MW5 and MW4 as the background wells, and MW3, M3, M3A, and TW4 (see Appendix 3) or alternative wells as approved by the U.S. EPA. Other groundwater monitoring wells shall be added to the groundwater monitoring program after the design of the groundwater extraction system and as determined to be necessary by the U.S. EPA. If groundwater monitoring wells within the sampling program are destroyed or in any way unsampleable, unless the water table has been seasonably lowered which temporarily prevents proper sampling for that sampling period,

they shall be repaired or replaced. The location of any additional wells installed pursuant to the Consent Decree or this SOW shall be approved by the U.S. EPA, in consultation with the State. Points of compliance regarding air and surface water sampling will be determined in the Work Plan and the O&M Plan.

III. SCOPE

The Remedial Action to be implemented by the Settling Defendants at the West KL Avenue Landfill site shall consist of five tasks. The Settling Defendants shall prepare and submit to the U.S. EPA and the MDNR an RD/RA Work Plan and RD Project Plans which shall consist of the following tasks and elements as described below and consistent with U.S. EPA guidance:

Task I: RD/RA Work Plan

A. Pre-design Work Plan
B. Additional Studies
C. Sampling and Analysis Plan
D. Quality Assurance Project Plan
E. Plan for Satisfaction of Permitting Requirements
F. Project Schedule

Task II: Remedial Design Project Plans

A. Design and Specifications Plan
B. Operation and Maintenance Plan
C. Cost Estimate
D. Construction Quality Assurance Objectives Plan
E. Health and Safety Plan
F. Design Phases
G. Community Relations Support

Task III: Remedial Action Construction

A. Responsibility and Authority
B. Construction Quality Assurance Personnel Qualifications
C. Inspection Activities
D. Sampling Requirements
E. Documentation

Task IV: Reports

A. Progress Reports
B. Draft Plans and Reports
C. Final Plans and Reports

Task V: Schedule for RD/RA Reports and Implementation

Task I: RD/RA WORK PLAN

The Settling Defendants shall prepare and submit to the U.S. EPA and the State, in accordance with the schedule set forth in Task V, below, Predesign Work Plan and an RD/RA Work Plan which shall document the overall management strategy for performing the RD/RA including but not limited to, identifying additional data needs necessary to initiate or complete the remedial action(s) (i.e., additional monitoring wells, geophysical work, pilot tests, etc.), and implementing the design, construction, operation, maintenance and monitoring of the Remedial Action(s), consistent with the ROD and the Consent Decree. The Work Plans shall document the qualifications, responsibility and authority of all organizations and key personnel involved with the implementation of the RD/RA, including contractor personnel. In addition, a plan for satisfaction of permitting requirements shall also be part of the Work Plans. Significant modifications to the SOW/Work Plans must be accomplished through the modification procedures as set forth within the Consent Decree. The Remedial Action portion of the Work Plan shall be revised to be consistent with the final terms of the approved remedial design. Minimally, the Work Plan shall include, but not be limited to, the following:

A. Pre-design Work Plan

Prior to the submittal of the RD/RA Work Plan, the Settling Defendant shall prepare and submit to the U.S. EPA and the State, a Pre-design Work Plan. The Pre-design Work Plan shall include, but not necessarily be limited to, the criteria needed to conduct a pump test at the site, to define the hydraulic characteristics and the potential interconnection between the upper and lower aquifer north and northeast of the site, and work needed to further define the groundwater divide to the east of the site. The Work to be covered within the Pre-design Work Plan, at a minimum, shall include the following:

1. The installation of two sets of nested piezometers, at locations to be approved by U.S. EPA in consultation with the MDNR, and possibly a third set of nested piezometers to the north and west of the site to define hydraulic conditions which may affect fluid flow and contaminant transport from the shallow to the deep aquifer. Vertical sampling of waters shall be performed as a contaminant screening activity during these boring activities. The nested piezometers shall be completed in each location chosen so that screens are installed at the top and base of the shallow aquifer and at the top of the deep aquifer. In the

event that the clay, identified as Zone V in the ROD and the Remedial Investigation Report is absent, screens shall be installed at the top and the base, no deeper than bedrock, of the aquifer.

2. The installation of two initial piezometer clusters, at locations to be approved by U.S. EPA in consultation with the MDNR, to better define hydraulic head levels to the east and the southeast of the site prior to the initiation of a pump test. These piezometers shall be used to better determine the location of a groundwater divide in the shallow aquifer and shall be monitored to demonstrate that reinjection of purged waters or pump test effluent will not cause the flow of additional waters over the divide. Additional piezometers clusters may be required to adequately define hydrogeologic conditions in this area at a future date.

3. Installation of additional piezometers which shall be utilized to gather potentiometric data during the pump test and potentially during subsequent remedial system operation evaluations.

4. Collection of static water elevation data from appropriate wells/piezometers, as approved by U.S. EPA in consultation with the MDNR; and

5. A description and application of any modelling that will be utilized to determine location selection criteria, construction, and installation of the purge/pump test well(s), the reinjection system and the monitoring wells/piezometers which will be used to conduct and gather pump test data and dispose of purged waters and to demonstrate that reinjection of water produced during the pump test will not cause further degradation of known groundwater conditions.

The construction of (including any materials used during the installation and completion) any monitoring well or piezometer shall be subject to the approval of the U.S. EPA in consultation with the MDNR. The draft Pre-design Work Plan shall include all necessary plans and reports as summarized below and shall be incorporated in as part of the RD/RA Work Plan. The Pre-design Work Plan shall be submitted to the U.S. EPA and the State in accordance with the schedule set forth in Task V, below.

B. Additional Studies

The Work Plan shall include a schedule and a description of any

additional studies that will be necessary to initiate and complete the RD/RA. These additional studies may include, but are not limited to, the installation of additional monitoring wells, further geophysical work, pump tests, vacuum extraction, pilot tests, soil gas study, etc. At the direction of the U.S. EPA, in consultation with the State, for any such studies/work required, the Settling Defendants shall furnish all services, plant, labor, equipment, investigations, studies, and superintendence. Any additional work shall be incorporated into the appropriate work and project plans (QAPP, H&S, Sampling, etc.) along with the schedule for the implementation of the additional work, and will need to be approved by the U.S. EPA in consultation with the State.

C. Sampling and Analysis Plan

The Work Plan shall include a Sampling and Analysis Plan that shall address all sampling required pursuant to the Consent Decree and this SOW, including but not limited to sampling of upper and lower aquifer groundwater, surface water, air, landfill gas and soil/sediment. The Sampling and Analysis Plan shall include, without limitation, identification and description of the contamination plume, compliance points, the quantity and timing of sampling at compliance points for testing the effectiveness of the remedial actions, and procedures for determining background concentrations of hazardous substances, pollutants, and contaminants.

D. Quality Assurance Project Plan (QAPP)

The Work Plan shall include a QAPP which shall establish quality control procedures to assure the precision and accuracy of all data gathered pursuant to the Consent Decree and this SOW. The QAPP shall be consistent with the requirements of the U.S. EPA Contract Lab Program (CLP). At a minimum, the QAPP shall include the following:

i. Statement of Purpose
ii. Project Description
iii. Project Organization and Responsibility
iv. Sampling Procedures and Objectives
v. Sample Custody and Document Control
vi. Calibration Procedures and Frequency
vii. Analytical Procedures, Data Reduction, Validation, Assessment, and Reporting
viii. Internal Quality Control Checks and Frequency
ix. Performance System Checks and Frequency
x. Preventive Maintenance Procedures and Frequency
xi. Data Precision, Accuracy and Completeness

Assessment Procedures
xii. Corrective Action
xiii. Quality Assurance Reporting

E. Plan for Satisfaction of Permitting Requirements

The Work Plan shall include a plan for the satisfaction of requirements for all permits needed to design and implement the RD/RA. In the case of permits not being required because the Work is being conducted entirely on-site the substantive requirements of the permit(s) which would otherwise be required and consistent with ARARs, shall be detailed in this Plan.

F. Project Schedule

The Work Plan shall contain a plan describing the overall project schedule, identifying timing for all tasks, including any additional studies that may be needed, construction and implementation of the final remedial actions and any major interim milestones. The project schedule shall be consistent with and designed to achieve the deadlines contained in the compliance schedule set forth in this SOW. The project schedule shall be revised as necessary, with changes listed in the monthly reports and subject to approval by the U.S. EPA, in consultation with the State.

Task II: REMEDIAL DESIGN PROJECT PLANS

The Settling Defendants shall prepare and submit to the U.S. EPA and the State, in accordance with the schedule set forth in Task V below, the following project plans prior to the implementation of the Remedial Actions at the facility as defined in the Purpose, and the Description of the Remedial Action of this SOW, the ROD, the Consent Decree and in the RD/RA Work Plan: (The number of copies of each submittal as required by this SOW and Consent Decree, and the recipients thereof, shall be specified in the Work Plan.)

A. Design and Specifications Plan

The Settling Defendants shall develop clear and comprehensive design and specification plans which shall include, but are not limited to, the following:

1. Discussion of the design strategy and the design basis, including;

    a. Compliance with all applicable and all relevant and appropriate environmental and public health standards; and

b. Minimization of environmental and public impacts.

2. Discussion of the technical factors of importance including:

   a. Use of currently accepted environmental control measures, design, and technology;

   b. The constructability of the design; and

   c. Use of currently acceptable construction practices and techniques.

3. Description of assumptions made and detailed justification of these assumptions;

4. Discussion of the possible sources of error and references to possible operation and maintenance problems;

5. Detailed drawings of the proposed design including;

   a. Qualitative flow sheets; and

   b. Quantitative flow sheets.

6. Tables listing equipment and specifications;

7. Tables giving material and energy balances, where appropriate;

8. Appendices including;

   a. Sample calculations (one example presented and explained clearly for significant or unique design calculations);

   b. Derivation of equations essential to understanding the report; and

   c. Results of laboratory or field tests.

The Design and Specifications Plan shall be submitted to the U.S. EPA and the State in phases as described in paragraph F below.

B. Operation and Maintenance Plan

The Settling Defendants shall prepare and submit to the U.S. EPA and the State, an Operation and Maintenance Plan to cover both

implementation and long term maintenance of the Remedial Actions. The plan shall be composed of, but not necessarily limited to, the following elements:

1. Description of normal operation and maintenance (O&M);

   a. Description of tasks for operation;

   b. Description of tasks for maintenance;

   c. Description of prescribed treatment or operation conditions; and

   d. Schedule showing frequency of each O&M task.

2. Description of potential operating problems;

   a. Description and analysis of potential operation problems;

   b. Sources of information regarding problems;

   c. Common and/or anticipated remedies; and,

   d. Useful life analysis of significant components and replacement costs

3. Quality Assurance Project Plan For O&M:

   a. Description of routine monitoring tasks;

   b. Description of required laboratory tests and their interpretation;

   c. Required data collection;

   d. Identification and rationale of the location of monitoring points (groundwater, surface water and air) comprising the points of compliance monitoring;

   e. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease; and,

   f. Description of triggering mechanisms for groundwater monitoring results, (i.e., detailing when the extraction system can be shut off and when it needs to be restarted).

4. Description of alternate O&M;

   a. Should systems fail, alternate procedures to prevent releases or threatened releases of hazardous substances, pollutants, or contaminants which may threaten public health, welfare or the environment or cause an exceedence of any cleanup standard established pursuant to the Consent Decree; and,

   b. Analysis of vulnerability and additional resource requirement should a failure occur.

5. Corrective Action;

   a. Description of corrective action to be implemented in the event that cleanup standards for groundwater,

      surface water discharges and air emissions are exceeded; and,

   b. Schedule for implementing these corrective actions;

6. Safety Plan For O&M;

   a. Description of precautions, of necessary equipment, etc., for site personnel;

   b. Safety tasks required in event of systems failure; and,

   c. Safety tasks necessary to address protection of nearby residents during design and construction.

7. Description of equipment;

   a. Equipment identification;

   b. Installation of monitoring components;

   c. Maintenance of site equipment; and

   d. Replacement schedule for equipment and installed components.

8. Records and reporting mechanisms required.

a. Daily operating logs;

b. Laboratory records;

c. Records for operating costs;

d. Mechanism for reporting emergencies;

e. Personnel and maintenance records; and,

f. Reports to Federal and State agencies.

An initial Draft Operation and Maintenance Plan shall be submitted simultaneously with the Prefinal Design Document submission, described in Task II.F, below, and the Final Operation and Maintenance Plan with the Final Design Documents.

C. Cost Estimate

The Settling Defendants shall develop and submit to the U.S. EPA and the State, cost estimates for the purpose of assuring that the Settling Defendants have the financial resources necessary to construct and implement the Remedial Action. The cost estimate developed in the FS shall be refined to reflect the more detailed/accurate design plans and specifications being developed. The cost estimate shall include both capital and operation and maintenance costs. An Initial Cost Estimate shall be submitted simultaneously with the Prefinal Design submission and the Final Cost Estimate with the Final Design Document.

D. Construction Quality Assurance Objectives Plan

The Settling Defendants shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel

qualifications; inspection activities; sampling requirements; and documentation.

E. Health and Safety Plan

The Settling Defendants shall modify the Health and Safety (H&S) Plan developed for the RI/FS to address the activities to be performed at the facility to implement the Remedial Design and Remedial Action phases. The modified H&S Plan shall be submitted to U.S. EPA and the State simultaneously with an initial draft of the Prefinal Design submission and the Final H&S Plan be submitted with the Final Design Document. The H&S Plan shall comply with all U.S. EPA guidance and all OSHA

requirements, including but not limited to 29CFR 1910.

F. Design Phases

The design of the Remedial Actions shall include, but not be limited to, the phases outlined below.

1. Preliminary design:

The Settling Defendants shall submit to U.S. EPA and the MDNR the Preliminary design when the design effort is approximately 30% complete. At this stage, the Settling Defendants shall have field verified the existing conditions of the facility. The preliminary design shall reflect a level of effort such that the technical requirements of the project have been addressed and outlined so that they may be reviewed to determine if the final design shall provide an operable and usable Remedial Action. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the program. The preliminary construction drawings by the Settling Defendants shall reflect organization and clarity. The scope of the technical specifications shall be outlined in a manner reflecting the final specifications. The Settling Defendants shall include with their preliminary submission, design calculations, where applicable, reflecting the same percentage of completion as the designs they support.

2. Intermediate design:

At the discretion of the Agency, a design review may be required at 60% completion of the project. The intermediate design submittal shall include the same elements as the prefinal design.

3. Correlating plans and specifications:

General correlation between drawings and technical specifications, is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, the Settling Defendants shall:

a. Coordinate and cross-check the specifications and drawings; and,

b. Complete the proofing of the edited specifications and required cross-checking of all drawings and

specifications.

These activities shall be completed prior to the 95% prefinal submittal to the Agency.

4. Equipment start-up and operator training:

The Settling Defendants shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, startup and operation of the treatment systems, and training covering appropriate operational procedures once the startup has been successfully accomplished. These activities shall be completed prior to the 95% prefinal submittal to the U.S. EPA.

5. Additional studies:

The design and/or implementation of the Remedial Actions may require additional studies to supplement the available technical data. At the direction of the Agency, for any such studies required, the Settling Defendants shall furnish all services, including field work as required, materials, supplies, plant, labor, equipment, investigations, studies and superintendence. Sufficient sampling, testing and analysis shall be performed to optimize the required treatment and/or disposal operations and systems. There shall be an initial meeting of all principal personnel involved in the development of the program for any additional studies. The purpose will be to discuss objectives, resources, communication channel, role of personnel involved and orientation of the Facility, etc. Settling Defendants shall submit to U.S. EPA and the State an interim report which shall present the results of all testing performed as part of any additional studies, together with a description of recommended treatment or disposal systems (including options). A review conference shall be scheduled after the interim report has been reviewed by all interested parties. The final report of the testing performed as part of any required additional study shall include all data taken during the testing and a summary of the results of the studies. The QAPP, Health and Safety Plan and Sampling and Analysis Plan previously submitted will be required to be modified to reflect any changes to the Work required as a result of such additional studies.

6. Prefinal and Final Design:

The Settling Defendants shall submit the Prefinal/Final design documents in two parts to the U.S. EPA and the MDNR. The first submission shall be at 95% completion of design (i.e., prefinal). After approval of the prefinal submission, the Settling Defendants shall execute any required revisions and submit the final documents 100% complete with reproducible drawings and specifications.

The Prefinal Design submittal shall consist of, but not be limited to the Design and Specifications Plan, Operation and Maintenance Plan, Operating and Maintenance Plan, Cost Estimate, Construction Quality Assurance Objectives Plan, QAPP and the Health and Safety Plan.

The Final Design submittal consists of, but not be limited to the Final Design and Specifications Plan (100% complete), the Settling Defendants' Final Construction Cost Estimate, the Final Operation and Maintenance Plan, Final Construction Quality Assurance Objectives Plan, Final QAPP, Final Project Schedule and Final Health and Safety Plan specifications. The quality of the design documents shall be such that the Settling Defendants shall be able to include them in a bid package and invite contractors to submit bids for the construction project.

G. Community Relations Support

A community relations program shall be implemented jointly by the U.S. EPA and the State. The Settling Defendants shall cooperate with the U.S. EPA and the State, participate in the preparation of all appropriate information disseminated to the public, and in public meetings that may be held or sponsored by the U.S. EPA or the State to explain activities at or concerning, the Facility. Community relations support shall be consistent with Superfund community relations policy as stated in the "Guidance for Implementing the Superfund Program" and "Community Relations in Superfund - A Handbook".

TASK III: REMEDIAL ACTION CONSTRUCTION

Within 60 days of U.S. EPA approval of the final design or within 60 days after the Consent Decree is entered, which ever time is later, the Settling Defendants shall develop and implement a construction quality assurance (CQA) program to ensure, with a reasonable degree of certainty, that the Remedial

Action, upon completion, will meet or exceed all design criteria, plans and specifications. The CQA plan is a facility-specific document which must be submitted to the Agency for approval prior to the start of the construction. At a minimum, the CQA plan shall include the elements, which are summarized below. Upon EPA approval of the CQA Plan, the Settling Defendants shall construct and implement the Remedial Actions in accordance with the approved design, schedule and the CQA plan. The Settling Defendants shall also implement the elements of the approved operation and maintenance plan.

A. Responsibility and Authority

The responsibility and authority of all organizations (i.e. technical consultants, construction firms, etc.) and key personnel involved in the construction of the Remedial Action shall be described fully in the CQA plan. The Settling Defendants shall also identify a CQA officer and the necessary supporting inspection staff.

B. Construction Quality Assurance Personnel Qualifications

The qualifications of the CQA officer and supporting inspection personnel shall be presented in the CQA plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

C. Inspection Activities

The observations and tests that shall be used to monitor the construction and/or installation of the components of the Remedial Actions shall be summarized in the CQA plan. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with the environmental requirements and include, but not be limited to air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. Inspections shall also ensure compliance with all health and safety procedures. In addition to oversight inspections, the Settling Defendants shall conduct the following activities:

1. Preconstruction inspection and meeting:

   The Settling Defendants shall participate with the U.S. EPA and the State in a preconstruction inspection and meeting to:

   a. Review methods for documenting and reporting inspection data;

b. Review methods for distributing and storing documents and reports;

c. Review work area security and safety protocol;

d. Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and,

e. Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person and minutes shall be transmitted to all parties.

2. Prefinal inspection:

Upon preliminary project completion, the Settling Defendants shall notify the U.S. EPA and the State for the purposes of conducting a prefinal inspection. The prefinal inspection shall consist of a walk-through inspection of the entire Facility. The inspection is to determine whether the project is complete and consistent with the contract documents and the U.S. EPA approved Remedial Action. Any outstanding construction items discovered during the inspection shall be identified and noted. Additionally, treatment equipment shall be operationally tested by the Settling Defendants. The Settling Defendants shall certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed. The prefinal inspection report shall outline the outstanding construction items, actions required to resolve items, completion date for these items, and a proposed date for final inspection.

3. Final inspection:

Upon completion of any outstanding construction items, the Settling Defendants shall notify the U.S. EPA and the State for the purposes of conducting a final inspection. The final inspection shall consist of a walk-through inspection of the Facility by U.S. EPA and the Settling Defendants. The prefinal inspection report shall be used as a checklist with the final inspection focusing on the outstanding construction

items identified in the prefinal inspection. Confirmation shall be made that outstanding items have been resolved.

D. Sampling Requirements

The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems in achieving the project specifications shall be presented in the CQA plan and carried out according to the Sampling Plan.

E. Documentation

Reporting requirements for CQA activities shall be described in detail in the CQA plan. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. Provisions for the final storage of all records shall be presented in the CQA plan.

TASK IV: Reports

The Settling Defendants shall prepare and submit to U.S. EPA and the State, plans, specifications, documents, and reports as set forth in Tasks I through Task V to document any additional studies, and the design, construction, operation, maintenance, and monitoring of the Remedial Action. Reports shall be signed by the Settling Defendants' Project Coordinator and shall include the following statement: "I certify that the information contained in or accompanying this (submission) (document) is true, accurate and complete". The documentation shall include, but not be limited to the following:

A. Progress Reports

The Settling Defendants shall at a minimum provide the EPA and the State with monthly progress reports until such time that the U.S. EPA approves the Certification of Completion of Construction Report and then thereafter shall submit to the U.S. EPA and the State semi-annual progress reports for operation and maintenance activities. These reports shall contain, at a minimum, the following:

1. A description and estimate of the percentage of the RD/RA completed;

2. All findings and results of sampling during the reporting period;

3. Summaries of all changes made in the RD/RA during the reporting period, indicating U.S. EPA/State approval of those changes;

4. Summaries of all contacts with representatives of the local community, public interest groups and/or State government during the reporting period;

5. Summaries of all problems or potential problems encountered during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period;

8. Projected work for the next reporting period; and,

9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Draft Plans and Reports to be submitted to U.S. EPA and MDNR

1. The Settling Defendants shall submit a draft Pre-design Work Plan and a RD/RA Work Plan as outlined in Task I;

2. The Settling Defendants shall submit a draft Design and Specifications Plan, Cost Estimates, Operation and Maintenance Plan, Construction Quality Assurance Objectives Plan, Health and Safety Plan, and Study Reports as outlined in Task II;

3. The Settling Defendants shall submit a draft construction Quality Assurance Program Plan and Documentation as outlined in Task III; and,

4. Within 30 days of completion of Task III.C.3 of the SOW, the Settling Defendants shall submit a draft Completion of Construction Report to the U.S. EPA and the State. The Report shall document that the project is consistent with the design specifications, and that Remedial Action is performing adequately. The Report shall include, but not be limited to the following elements:

   a. Synopsis of the Remedial Action and certification of the design and construction;

   b. Explanation of any modifications to the plans and why these were necessary for the project;

c. Listing of the criteria, established before the Remedial Action was initiated, for judging the functioning of the Remedial Action and also explaining any modification to these criteria;

d. Results of facility monitoring, indicating that the Remedial Action shall meet or exceed the performance and cleanup standard criteria;

e. Actions taken as a result of the Prefinal Inspection; and,

f. Explanation of the operation and maintenance (including monitoring) to be undertaken at the facility.

5. When the Settling Defendants deem that they have achieved cleanup and performance standards, pursuant to the Consent Decree, they shall submit a draft Remedial Action Report to the U.S. EPA and the State. The Report shall document that the project is consistent with the design specifications, and that the Remedial Action was performed adequately and the goals have been met. The Report shall include, but not be limited to the following elements:

a. Synopsis of the Remedial Action and certification of the design and construction;

b. Explanation of any modifications to the plans and why these were necessary for the project;

c. Listing of the cleanup and performance standards as established in the Consent Decree and also

explaining any modifications to these cleanup and performance standards;

d. Results of Facility monitoring, indicating that the Remedial Action has met or exceeded the cleanup and performance criteria; and,

e. Explanation of the operation and maintenance (including monitoring) to be undertaken at the Facility as outlined in Task IIB.

C. Final Plans and Reports

The Settling Defendants shall finalize the Pre-design Work Plan, RD/RA Work Plan, Design and Specifications Plan, Cost Estimates

Plan, Operation and Maintenance Plan, Health and Safety Plan, Study Reports, Construction Quality Assurance Program Plan/Documentation, Completion of Construction Report, and Remedial Action Report incorporating comments received on draft submissions. Following the approval of the Final Completion of Construction Report, the U.S. EPA will issue a Certification of Completion of Remedial Construction to the Settling Defendants.

TASK V: Schedule for RD/RA Implementation

A summary of reporting requirements contained in the RD/RA Scope of Work is presented below:

Submission	Due Date
1. Draft Pre-design Work Plan (Task I, A-E)	Thirty (30) days after lodging of the Amended Consent Decree
2. U.S. EPA Comment of Draft	***
3. Final Pre-design Work Plan	Thirty (30) days after U.S. EPA comment on the draft Pre-design Work Plan
4. Implementation of Pre-design Work	Thirty (30) days after U.S. EPA approval of Final Pre-design Work Plan
5. Draft Pre-design Report	Thirty (30) days after completion of Pre-design work
6. U.S. EPA Comment on Draft	***
7. Final Pre-Design Report	Thirty (30) days after U.S EPA comment on the draft Pre-design Report

Submission	Due Date
8. a. Draft Work Plan for Municipal Water Supply	30 days after lodging the Consent Decree Amendment

b. Final Work Plan for Municipal Water Supply	30 days after U.S. EPA comment on the draft
c. Implement the Municipal Water Supply Final Work Plan	30 days after U.S. EPA approval of the Final Work Plan
d. Draft Municipal Water Supply Report	30 days after completing the Municipal Water Supply Work Plan work.
e. Final Municipal Water Supply Report	30 days after U.S. EPA comment on the draft Municipal Water Supply Work Plan work.
9. Draft RD/RA Work Plan Task I, A-E)	Thirty (30) days after the U.S EPA approval of the Final Pre-design Report
10. U.S. EPA Comment on Draft	***
11. Final RD/RA Work Plan (Task I)	Thirty (30) days after U.S. EPA comment on the Draft Work Plans
12. U.S. EPA Approval of Final Work Plan	***
13. Remedial Design Project Plans (Task II A,F)	
a. Preliminary Design (30% completion)	Seventy-five (75) days after U.S. EPA approval of Final Work Plan

Submission	Due Date
b. U.S. EPA Approval of Preliminary Design	***

c. Intermediate Design (60% completion)	Sixty (60) days after U.S. EPA approval of Preliminary Design. Intermediate Design may not be required.
d. U.S. EPA Approval of Intermediate Design, if required	***
e. Prefinal Design (95% completion)	Sixty (60) days after U.S. EPA approval of the Intermediate Design (if Intermediate Design is called for), or 120 days after approval of the Preliminary Design in the event the Intermediate Design is not required, as determined by the U.S. EPA.
f. U.S. EPA Approval of Prefinal Design	***
g. Final Design (100% completion)	Thirty (30) days after U.S. EPA approval of Prefinal Design
(Task II B through E)	
a. Draft Submittals	Concurrent with Prefinal Design
b. Final Submittals	Concurrent with Final Design

Submission	Due Date
14. Draft Construction Quality Assurance Plan (CQAP)	Sixty (60) days after submittal of and U.S. EPA

	approval of Final Design (Task II) or Sixty (60) days after the Consent Decree is entered, which ever is later.
15. U.S. EPA Comment on Draft CQAP	***
16. Final Construction Quality Assurance Plan (Task III)	Thirty (30) days after U.S. EPA comment on Draft CQAP
17. U.S. EPA Approval of Final CQAP	***
18. Pre-Construction Inspection Report	As approved in the Final CQAP
19. Construction of Remedial Actions	As approved in the Final CQAP
20. U.S. EPA Prefinal Inspection	***
21. Prefinal Inspection Report	Thirty (30) days after U.S. EPA's Prefinal Inspection
22. Draft Completion of Construction Report (Task IV)	Thirty (30) days after completion of Task III.C.3. of the SOW regarding final inspection.
23. U.S. EPA Comment on the Draft Completion of Construction Report	***
24. Final Completion of Construction Report	Thirty (30) days after U.S. EPA comment on Draft Completion of Construction Report

Submission	Due Date
25. Draft Remedial Action Report (Task IV)	After achievement of cleanup and performance

	standards
26. U.S. EPA Comment on Draft Remedial Action Report	***
27. Final Remedial Action Report	Thirty (30) days after U.S. EPA comment on the draft Remedial Action Report
28. Progress Reports prior to U.S. EPA's Approval of the Certification of the Completion of Construction	Monthly
29. Progress Reports after U.S. EPA Approval of the Certification of Completion of Construction	Semi-annual
30. Status Report (per Paragraph 31 of the Consent Decree)	Annually

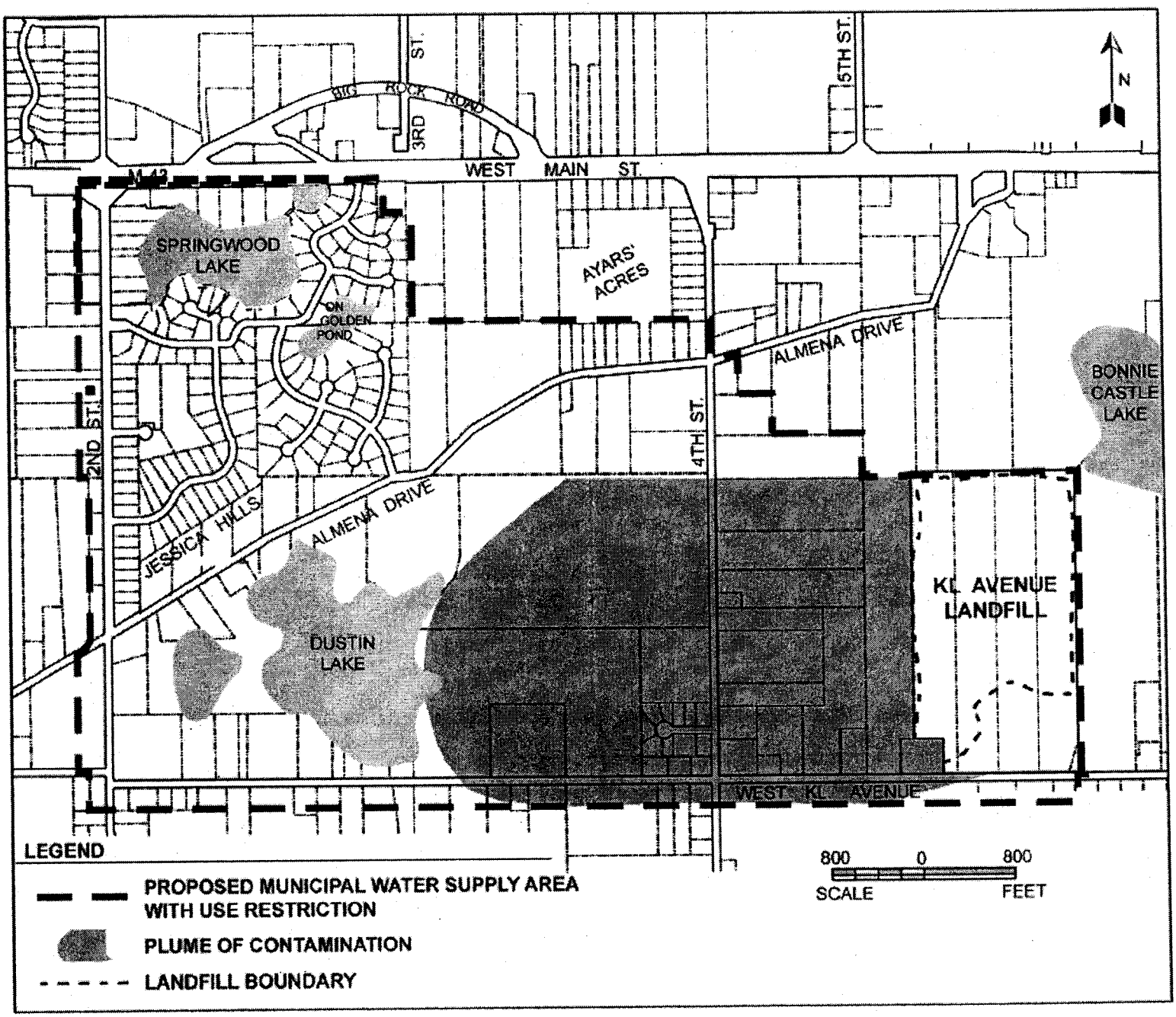

Figure 1

January 13, 2004

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

April 1, 1991

TO: All Environmental Response Division Staff

FROM: James G. Truchan, Chief
Environmental Response Division

SUBJECT: Rule Interpretation Memo #1 - REVISED: Administrative Rules 511, 513, 519, 703(f), 707(b), and 721. Analytical Detection Level Guidance for Environmental Contamination Response Activities under Act 307 Rules

This is a revision of the December 7, 1990 memo on the above subject. Upon further review of the memo, it is necessary to update the previously issued guidance. Please substitute this correspondence for the earlier version.

Division staff will frequently be involved in the design, review, and approval of cleanup plans, monitoring plans, consent decrees, and similar documents where analytical methods and method detection limits are specified for final cleanups. Act 307 rules require cleanups to comply with Type A, B, or C criteria. Type A criteria require cleanup to either background levels or method detection limits (Rule 707). Type B criteria are risk-based numbers and will frequently be below method detection limits. When Type B criteria are <u>below</u> method detection limits, the cleanup level is generally established <u>at</u> method detection limits [Rule 721(a)]. However, measured levels exceeding method detection limits but less than the practical quantitation level may be sufficient for cleanup where the difference between the method detection limit and measured level(s) is determined not to be statistically significant by a method acceptable by the department [Rule 721(b)].

Method detection limits may vary considerably between laboratories performing the same analysis. However, because it is important to conduct site cleanup work consistently, a list of acceptable method detection levels was developed as a guide to identify suitable detection levels for site cleanup work.

The acceptable method detection levels listed in Table 1 were developed by reviewing the method detection limit based data reporting levels of government and commercial laboratories, selecting those levels which were as close to the Type B risk-based criteria as practical, and were achievable and available from a reasonable number of laboratories. Table 2 identifies analytical methods capable of achieving these acceptable method detection levels. Other methods with suitable sensitivity may also be appropriate.

All site analyses need not be performed at these low levels. The primary purpose of these low levels is to determine the extent of contamination [Rules 511(3)(a) and 511(3)(v)] and to evaluate final cleanups [Rule 513(1)(b)]. Less sensitive methods (higher detection limits) may be acceptable for other purposes, such as in the case of preliminary site evaluation work or to determine off-site waste disposal requirements.

This list will be reviewed periodically and revised as new methodology is developed, as laboratory instrumentation is improved, and as new substances are added. Risk-based cleanups and clean closure type activities under RCRA, Superfund, and state programs will influence detection capabilities and provide incentives to labs and instrument manufacturers to achieve lower levels.

This memo is intended to provide guidance to division staff to foster consistent application of the Michigan Environmental Response Act (P.A. 307, as amended) and the Administrative Rules promulgated thereunder. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Use of acceptable method detection limits and associated methods as outlined in this interoffice communication will be considered demonstration of compliance with rules related to method detection limits, specifically Rule 721(a). The list does not include all possible contaminants and will be updated as new methods and method detection capabilities become available. Contact George Jackson at 373-3561 for detection limit information for contaminants not included on this list.

Attachment

cc: Air Quality Division
Surface Water Quality Division
Waste Management Division

Table 1. Acceptable Method Detection Levels for Environmental Contamination Response Activities under Act 307 Rules.

Volatile Organics	Groundwater (µg/l) Acceptable Method Detection Level	Soil (µg/Kg-dry wt.) Acceptable Method[1] Detection Level
Chloromethane	1	10
Bromomethane	1	10
Vinyl Chloride	1	10
Chloroethane	1	10
Methylene Chloride	1	10
Acetone	5	10
1,1-Dichloroethene	1	10
1,1-Dichloroethane	1	10
1,2-Dichloroethene(cis)	1	10
1,2-Dichloroethene(trans)	1	10
Chloroform	1	10
1,2-Dichloroethane	1	10
2-Butanone (MEK)	5	10
1,1,1-Trichlorethane	1	10
Carbon Tetrachloride	1	10
Bromodichloromethane	1	10
1,2-Dichloropropane	1	10
1,3-Dichloropropene(cis)	1	10
Trichloroethene	1	10
Dibromochloromethane	1	10
1,1,2-Trichloroethane	1	10
Benzene	1	10
1,3-Dichloropropene(trans)	1	10
Bromoform	1	10
Tetrachloroethene	1	10
Toluene	1	10
1,1,2,2-Tetrachloroethane	1	10
4-Methyl-2-pentanone	5	10
2-Hexanone	5	10
Chlorobenzene	1	10
Ethylbenzene	1	10
Xylene	1	10
Methy(tert)butylether (MTBE)	5	10
Phenols		
2-Chlorophenol	5	330
2-Nitrophenol	5	330
Phenol	5	330
2,4-Dimethylphenol	5	330
2,4-Dichlorophenol	5	330
2,4,6-Trichlorophenol	5	330
4-Chloro-3-methylphenol	5	330
2,4-Dinitrophenol	20	1700
2-Methyl-4,6-dinitrophenol	20	1700
Pentachlorophenol	20	1700
4-Nitrophenol	20	1700

	Groundwater (µg/l)	Soil (µg/Kg-dry wt.)
	Acceptable Method Detection Level	Acceptable Method[1] Detection Level
Aniline Compounds		
4-Chloroaniline	5	330
2-Nitroaniline	20	1700
3-Nitroaniline	20	1700
4-Nitroaniline	20	1700
Aniline	20	1700
Chlorinated Hydrocarbons		
2-Chloronaphthaline	5	330
1,2-Dichlorobenzene	5	330
1,3-Dichlorobenzene	5	330
1,4-Dichlorobenzene	5	330
Hexachlorobenzene	5	330
Hexachlorobutadiene	5	330
Hexachlorocyclopentadiene	5	330
Hexachloroethane	5	330
1,2,4-Trichlorobenzene	5	330
Haloethers		
Bis(2-chloroethyl)ether	5	330
Bis(2-chloroethoxy)methane	5	330
Bis(2-chloroisopropyl)ether	5	330
4-Bromophenyl phenyl ether	5	330
4-chlorophenyl phenyl ether	5	330
Nitrosamines		
N-Nitrosodiphenylamine	5	330
N-Nitrosodi-n-propylamine	5	330
Nitroaromatics		
2,4-Dinitrotoluene	5	330
2,6-Dinitrotoluene	5	330
Isophorone	5	330
Nitrobenzene	5	330
Phthalates		
Bis(2-ethylhexyl)phthalate	5	330
Butyl benzyl phathalate	5	330
Di-n-butyl phathalate	5	330
Diethyl phthalate	5	330
Dimethyl phthalate	5	330
Di-n-octyl phthalate	5	330

	Groundwater (µg/l)	Soil (µg/Kg-dry wt.)
	Acceptable Method Detection Level	Acceptable Method[1] Detection Level
Polynuclear Aromatic Hydrocarbons		
Acenaphthene	5	330
Acenaphthylene	5	330
Anthracene	5	330
Benzo(a)anthracene	5	330
Benzo(b)fluoranthene	5	330
Benzo(k)fluoranthene	5	330
Benzo(a)pyrene	5	330
Benzo(g,h,i)perylene	5	330
Chrysene	5	330
Dibenzo(a,h)anthracene	5	330
Fluoranthene	5	330
Fluorene	5	330
Indeno(1,2,3-cd)pyrene	5	330
Naphthalene	5	330
Phenanthrene	5	330
Pyrene	5	330
Pesticides		
Aldrin	0.01	1.7
a-BHC	0.01	1.7
b-BHC	0.01	1.7
g-BHC	0.01	1.7
r-BHC	0.01	1.7
a-chlordane	0.01	1.7
g-chlordane	0.01	1.7
4,4'-DDD	0.01	3.3
4,4'-DDE	0.01	3.3
4,4'-DDT	0.01	3.3
Dieldrin	0.01	3.3
Endosulfan I	0.01	3.3
Endosulfan II	0.01	3.3
Endosulfan Sulfate	0.01	3.3
Endrin	0.01	3.3
Endrin Aldehyde	0.01	3.3
Heptachlor	0.01	1.7
Heptachlor epoxide	0.01	1.7
Toxaphene	0.1	170
PCB 1016	0.1	33
PCB 1221	0.1	33
PCB 1232	0.1	33
PCB 1242	0.1	33
PCB 1248	0.1	33
PCB 1254	0.1	33
PCB 1280	0.1	33

	Groundwater (µg/l)	Soil (µg/Kg-dry wt.)
	Acceptable Method Detection Level	Acceptable Method[1] Detection Level
Metals		
Arsenic	1	50
Barium	10	1000
Cadmium	0.2	5
Chromium	1	50
Copper	1	25
Lead	3	125
Mercury	0.2	50
Nickel	2	125
Selenium	2	500
Silver	0.5	25
Zinc	20	50

Footnote:

[1] All acceptable method detection levels for soil are based on dry weight. The purpose of using dry weights is to standardize detection based cleanup levels by omitting variability caused by varying moisture levels. This requirement means that laboratories must target their wet weight reporting levels at 20-50% below the levels in this list in order to achieve the listed levels after correction for percent moisture.

Table 2. Recommended Methods for Environmental Contamination Response Activities under Act 307 Rules.

I Organics

A. Volatile Organic Contaminants*: Acceptable method detection levels for most volatile organic compounds are 1 µg/l for water and 10 µg/Kg for soil. These levels allow measurement below the Type B risk levels for most compounds. These detection limits are generally consistent with the abilities of laboratories using either GC/PID-HECD or GC/MS purge and trap high resolution capillary column analysis. The following methods are generally capable of achieving the acceptable method detection levels and are appropriate for assessing site remediation provided that detection levels are achieved.

a. Groundwater
   1. Methods 601 and 602
   2. Methods 8010A and 8020A
   3. Method 8021
   4. Method 8240A
   5. Method 8260
   6. Method 502.1 and Method 503.1
   7. Method 502.2
   8. Method 524.1 or 524.2
   9. USEPA Contract Laboratory Program (CLP); Statement of Work (SOW) for Low Concentration Water for Organic Analysis (4/90) - Volatile Fraction

b. Soil
   1. Method 8021
   2. Method 8240
   3. Methods 8010A and 8020A when used with soil sample sparging procedures described in 5030A, 8021, 8240A, 8260, and USEPA CLP Organic RAS procedures.
   4. Method 8260
   5. USEPA Contract Laboratory Program Statement of Work for Multi-Media, Multi-Concentration Organic Analysis.

* MTBE in groundwater can be analyzed by common GC/MS volatile organic methods including methods 624, 8240A, 8260, 524.1, 524.2, and the CLP Low concentration SOW for organics. Soil samples can be analyzed by methods 8240A, 8260, and the CLP Multi-media, Multi-Concentration SOW for organics. Common GC methods utilizing photoionization detectors (602, 8020A, 8021, 502.2, and 503.1) are believed to lack the necessary sensitivity to achieve the listed detection levels and are therefore not appropriate.

B. Acid Extractable Organics (Phenols)

a. Groundwater
   1. USEPA Contract Laboratory Program Statement of Work for Low Concentration Water for Organic Analysis (4/90) - Acid Extractable Fraction or other similar methodology such as Method 8270A - Acid Extractable Fraction operated or modified to achieve these detection levels.

b. Soil

1. USEPA Contract Laboratory Program Statement of Work for Multi-media Multi-concentration Organic Analysis (Document Number OLM01.0) - Acid Extractable Fraction or other similar methodology such as Method 8270A - Acid Extractable Fraction operated or modified to achieve these detection levels.

C. Base/Neutral Extractable Organics (Aniline Compounds, Chlorinated Hydrocarbons[1], Haloethers, Nitrosamines, Nitroaromatics, Phthalates[2], Polynuclear Aromatics[3]

a. Groundwater

1. USEPA Contract Laboratory Program Statement of Work for Low Concentration Water for Organic Analysis (4/90) - Base/Neutral Extractable Fraction or other similar methodology such as Method 8270A - Base/Neutral Extractable Fraction operated or modified to achieve these detection levels.

b. Soil

1. USEPA Contract Laboratory Program Statement of Work for Multi-media Multi-concentration Organic Analysis (Document Number OLM01.0) - Base/Neutral Extractable Fraction or other similar such as Method 8270A - Base/Neutral Extractable Fraction, operated or modified to achieve these detection levels.

Footnotes:

1 Most commercial laboratories are set up to analyze chlorinated hydrocarbons by GC/MS. The acceptable method detection levels of 5 µg/l for water and 330 µg/Kg for soil are about as low as can reasonably be expected from conventional GC/MS methodology. These acceptable method detection levels are below risk-based levels for 1,2-Dichlorobenzene and Hexachlorocyclopentadiene. If lower detection levels are necessary they can be achieved through the use of GC/Election Capture methodology such as Methods 612 or 8120. The DNR laboratory employs such methodology and is able to detect levels for 0.01 to 0.02 µg/l for the highly halogenated compounds, 0.2 µg/l for the dichlorobenzenes, and 1.0 µg/l for 2-chloronaphthalene.

2 Most commercial laboratories are set up to analyze phthalates by GC/MS. The acceptable method detection levels of 5 µg/l for water and 330 µg/Kg for soil are about as low as can reasonably be expected from conventional methodology. These acceptable method detection levels are well below risk-based levels for Butyl benzyl phthalate and Di-n-butyl phthalate. Somewhat lower detection levels may be achievable through the use of GC/Electron Capture methodology such as Method 606 or 8060.

3 Most commercial laboratories are set up to analyze polynuclear aromatic compounds by GC/MS. The acceptable method detection levels of 5 µg/l for water and 330 µg/Kg for soil are reasonable for conventional GC/MS methodology. Lower detection levels can be achieved by High Performance Liquid Chromatography (HPLC) methodology such as Methods 610 or 8310. These methods are capable of detecting the carcinogenic PNA's at less

than 1 µg/l in water and at less that 100 µg/Kg in soils. Compound identifications by HPLC should be confirmed by other qualitative techniques such as GC/MS or other detectors. GC/MS lacks the sensitivity to confirm at these lower levels.

D. Pesticides

a. Groundwater
   1. Method 608 or Method 8080A

b. Soil
   1. USEPA Contract Laboratory Program Statement of Work for Multi-media, Multi-concentration Organic Analysis-Pesticide fraction or other similar methods such as Method 8080A modified or operated to achieve these detection levels.

II Inorganics

A. Metals and Cyanide

	Groundwater	Soil
Arsenic	206.2, 7060A, 7061A	7060A, 7061A
Barium	200.7, 6010A	6010A
Cadmium	213.2, 7131A	7131A
Chromium	218.2, 7191	7191
Copper	220.2, 7211A	7211A
Lead	239.2, 7421	7421
Mercury	245.1, 245.2	245.5, 7471
Nickel	249.2	7211
Selenium	270.2, 7741A	7741A
Silver	272.2, 7761	7761
Zinc	289.2, 7951	7951
Cyanide	335.2, 335.3, 9010A, 9012	9010A

III Method References

Method Numbers	Parent Document
200's-300's	Methods for Chemical Analysis of Water and Waste, EPA-600/4-79-020, Revised March 1983.
500's	Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water, September, 1986.
600's	Code of Federal Regulations, Title 40, Part 136, Appendix A.
6000's to 9000's	Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 1, January 1990.

WEST KL AVENUE LANDFILL
CONSENT DECREE
APPENDIX 3
MAP OF FACILITY